

REMARKS

The Office Action dated December 16, 2003 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto.

Claims 1-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,288,889 to Takago et al ("Takago") or European Patent Application No. 0433070 issued to Pellerite ("Pellerite"). In making this rejection, the Office Action asserts that these references show "fluorinated organosilicon compounds which can be utilized as water and oil repellent coatings" and that "it would be prima facie obvious to select the [compounds claimed in the present application]."

Applicant respectfully traverses this rejection. Applicant submits that the presently claimed invention would not have been rendered obvious by the applied references.

The presently claimed invention relates to a process for improving the surface hydro- and oil-repellence properties of substrata having a low surface energy such as in particular polytetrafluoroethylene (PTFE). This lower wettability can improve the resistance to penetration of liquids (water and hydrocarbons) in membranes or porous septa. In particular, formula (I) and (II) of claim 1 contain silyl end groups consisting of the $-\text{Si}(\text{R}_1)_a(\text{OR}_2)_{3-a}$ group wherein R_1 and R_2 are alkyl groups, aryl groups, or alkyl-aryls or aryl-alkyls, that are either the same or different from one another. Hence, Applicant submits that the silyl end groups of the present invention exclude alkylene groups with double bonds. See, the Specification, page 2, first full paragraph.

Applicant submits that Takago does not teach or suggest the presently claimed invention. In particular, Takago discloses that the isopropenoxysilyl group, which is an

essential component of the Takago invention, is an alkylene radical, i.e., having a double bond. See, Takago formula (I) of claim 1, or column 2, last line bridging to column 3, first line.

Applicant further notes that at least one object of the presently claimed invention is to find materials having a low surface energy that are used in the preparation of porous and non-porous membranes. In particular, the present invention improves the surface hydro- and oil-repellence properties of substrata such as polyethylene, polypropylene, polyolefine elastomers, thermoplastic copolymers of tetrafluoroethylene, thermoplastic homopolymers and copolymers of vinylidenfluoride or of chlorotrifluoroethylene, in particular PTFE. See, the Specification, page 5, last line to page 6, line 2, and page 2, third full paragraph. Takago does not teach or suggest any solutions to the technical problem addressed by the present invention.

For instance, Examples 2-5 indicate that the angle contact of the PTFE plate increases by more than 10% when a solution of the presently claimed compound is applied in either water or n-hexadecane solvents. Takago does not teach or suggest the use of a saturated silane compound for treating a PTFE surface, as claimed in the present invention. Rather, Takago explicitly refers to the effectiveness of the compound containing unsaturated isopropenoxyisilyl groups in the water and oil repellence to silicone rubbers. See, Takago, column 4, line 66 to column 5, line 2.

The double bond of the silyl group disclosed in Takago is only effective in permanence on a silicon rubber surface. Therefore, according to the teaching and suggestions of Takago, one skilled in the art would have been expected to exclusively use the silane compound disclosed by Takago in silicon rubbers. Moreover, Takago

would not have taught or suggested one skilled in the art to use the silane compound disclosed in Takago for polyethylene, polypropylene, polyolefine elastomers, thermoplastic copolymers of tetrafluoroethylene, thermoplastic homopolymers and copolymers of vinylidenefluoride or of chlorotrifluoroethylene, which are exemplary substrata disclosed in the present specification. See, the Specification, page 5, last line to page 6, line 2.

The present invention is distinguishable from Takago on at least the chemical saturated structure of the silane compound and at least based on the different substrata that can be treated for improving their surface hydro- and oil-repellence properties.

Applicant further submits that the presently claimed invention is distinguishable from Pellerite. In particular, Applicant notes that Pellerite refers to a composition used in order to form low-surface energy liners that can be used with aggressive pressure-sensitive adhesive. The preferred substrata disclosed by Pellerite include materials, which are used as backings for pressure-sensitive adhesive products, such as polyester, polyimide, polyamide, polyolefin, polycarbonate films and other materials including glass, ceramic, metal and rubber. In particular, Pellerite discloses that the pressure-sensitive adhesive in contact with the release liners can have very high readhesion values, in excess of 90% of those of control adhesive which have not been in contact with any release coating of liner. See Pellerite, page 3, lines 2-3 and lines 23-25, and page 10, lines 5-8.

Applicant notes that no PTFE substrata or other substrata for membranes is indicated by Pellerite. Applicant further notes that the technical problem solved by Pellerite is different from that of the present invention, i.e. improving hydro- and oil-

repellence properties of substrata such as PTFE, having a critical wetting tension lower than 40 mN/meter.

Additionally, Applicant notes that an essential feature required in Pellerite is that the coating composition can have more than 50% inert oils without significantly reducing the readhesion of adhesives removed. See, Pellerite, page 3, lines 27-28. The essential inert oil used in the composition of Pellerite is described by the formulas on page 8, line 36 of Pellerite.

Applicant notes that one skilled in the art solving the technical problem of the present invention (i.e. to improve hydro- and oil-repellence properties) would not use the composition disclosed by Pellerite, which comprises up to 50% of oily substance and which would therefore not have an improved oil-repellence property.

Moreover, Pellerite discloses the user of polyfluoropolyether polymers, having end groups such as acrylate, isocyanato, or propyltriethoxysilane. See, Pellerite, page 4, lines 41 to page 8, line 25.

Applicant notes that the presently claimed process selects from the above polyfluoropolyether polymers disclosed in Pellerite, but only those matching the claimed formulas (I) or (II) having silyl end groups. The present claims require substrata having a critical wetting tension lower than 40 mN/meter. However, one skilled in the art would not be able to find a teaching or suggestion in Pellerite that by selecting from the only the silane polyfluoropolyethers compounds disclosed in Pellerite, and omitting the essential oily component of Pellerite, it would be possible to improve the hydro- and oil-repellence of a substrate having a critical wetting tension lower than 40 mN/meter, such

as PTFE. Applicants note that Pellerite does not cite PTFE, which is used for porous septa in the presently claimed invention.

Thus, Takago, Pellerite or the combination thereof would not have rendered obvious the presently claimed invention. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-14 under 35 U.S.C. § 103(a).

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of claims 1-14, and the prompt issuance of a Notice of Allowability are respectfully solicited.

If this application is not in condition for allowance, the Examiner is requested to contact the undersigned at the telephone listed below.

In the event this paper is not considered to be timely filed, Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 108910-00032**.

Respectfully submitted,

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